Ordering number: EN1321E

Monolithic Linear IC

LA4261

3.5 W 2-Channel AF Power Amplifier for Home Stereos and Music Centers

Features

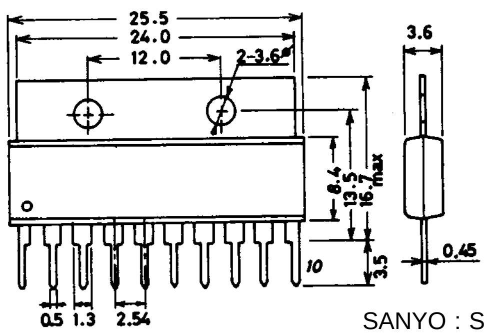
- Minimum number of external parts required (No input capacitor, bootstrap capacitor required).
- High output: 3.5 W typ. ×2.
- Soft clip, causing little harmonic disturbance to radios (See page 8).
- Small pop noise at the time of power switch ON/OFF (See page 8).
- Built-in protector against abnormal modes (Thermal shutdown, overvoltage).

Package Dimensions

3018A-SIP10F

unit : mm

[LA4261]



SANYO : SIP10F

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}max$		25	V
Maximum output current	I_{OP}	1 channel	2.0	A
Allowable power dissipation	Pd max	With heat sink (see Pd – Ta characteristics)	7.5	W
Operating temperature	Topr		–20 to +75	°C
Storage temperature	Tstg		–40 to +150	°C

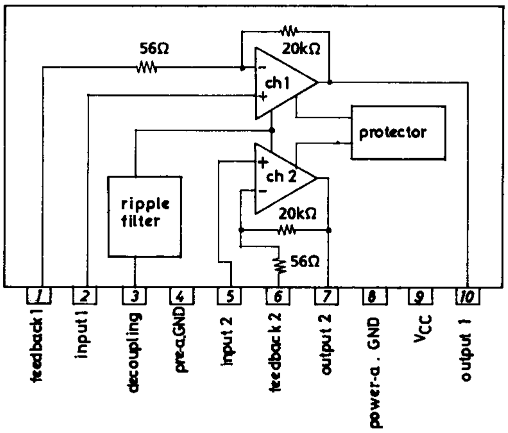
Operating Conditions at Ta = 25°C

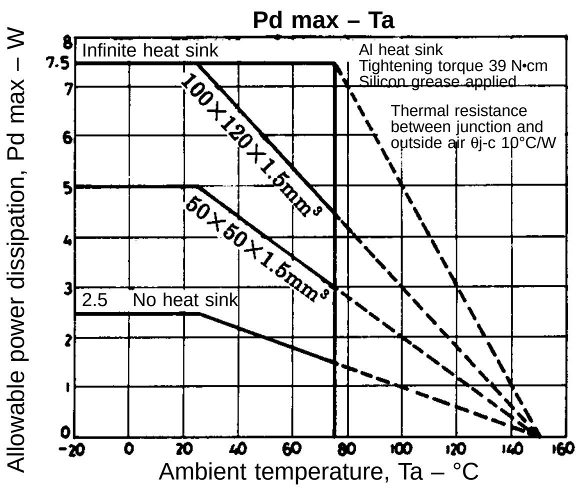
parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		16	V
Recommended load resistance	R_L		8	Ω
Operating supply voltage range	V_{CC} op		9 to 24	V

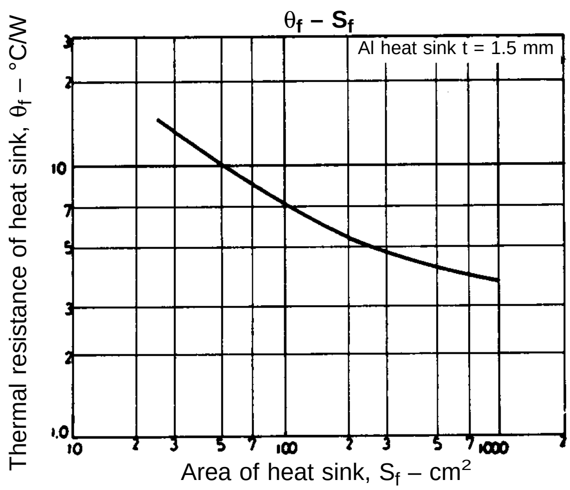
Operating Characteristics at Ta = 25°C, V_{CC} = 16 V, R_L = 8 Ω, f = 1 kHz, Rg = 600 Ω, (circuit 1)

Parameter	Symbol	Conditions	min	typ	max	Unit
Quiescent current	I_{CCO}			46	62	mA
Voltage gain	VG		48	50	52	dB
Output power	P_O	THD = 10%	3.0	3.5		W
Total harmonic distortion	THD	P_O = 0.5 W		0.3	1.0	%
Output noise voltage	V_{NO}	Rg = 10 kΩ, BW = 20 Hz to 20 kHz		0.65	1.5	mV
Ripple rejection ratio	Rr	Rg = 0, Vr = 500 mV	40	50		dB
Crosstalk	CT	Rg = 10 kΩ	40	55		dB
Voltage gain difference	ΔVG				1.5	dB

Equivalent Circuit Block Diagram

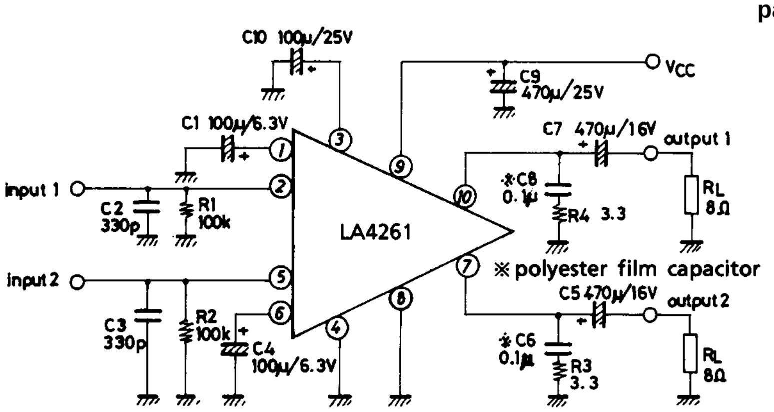






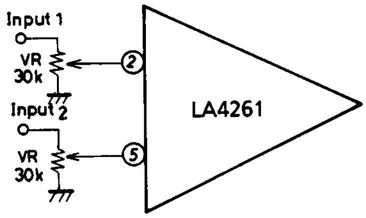
Sample Application Circuit 1:

Recommended Circuit



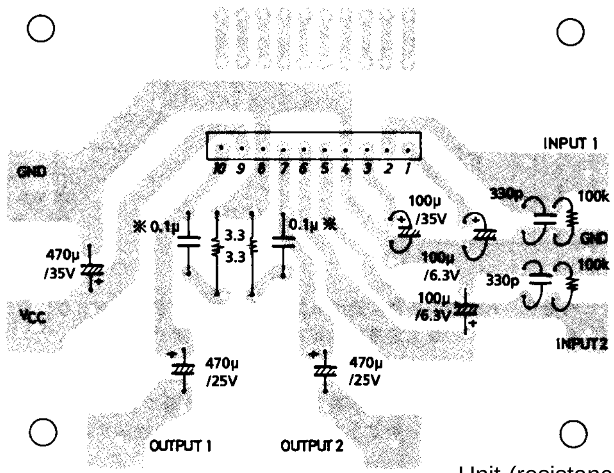
Sample Application Circuit 2:

Circuit with minimum number of external parts



Unit (resistance: Ω, capacitance: F)

Sample Printed Circuit Pattern



※ polyester film capacitor

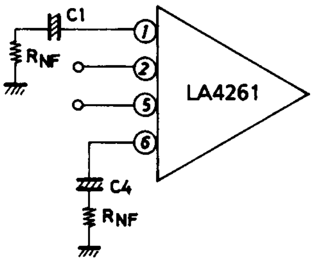
Unit (resistance: Ω, capacitance: F)

Description of External Parts

C1, C4	100 µF	Feedback capacitor Decreasing the capacitance value lowers the low frequency response. Increasing the capacitance value makes the starting time later.
C2, C3	330 pF	Input short capacitor Reduces the high frequency noise when the input impedance is increased. Not required when the input impedance is decreased.
C5, C7	470 µF	Output capacitor Decreasing the capacitance value causes insufficient power at low frequencies.
C6, C8	0.1 µF polyester film capacitor	Oscillation blocking capacitor Decreasing the capacitance value causes oscillation to occur easily. Use a polyester film capacitor that is good in high frequency response and temperature characteristic. The use of an electrolytic capacitor may cause oscillation to occur at low temperatures.
C9	470 µF	Power capacitor Decreasing the capacitance value causes ripple to occur. Locating at a distance from the IC or removing this capacitor may cause oscillation to occur.
C10	100 µF	Ripple filter capacitor Decreasing the capacitance value excessively or removing this capacitor causes ripple to occur. However, increasing the capacitance value does not always cause ripple to be reduced. Decreasing the capacitance value makes the starting time earlier.
R1, R2	100 kΩ	Input bias resistor Determines the bias (bias of GND potential) to be applied to the input pin and the input impedance. Not required if variable resistors are used.
R3, R4	3.3 Ω	Resistor connected in series with oscillation blocking capacitor. Prevents phase shift attributable to the oscillation blocking capacitor so that oscillation is hard to occur.

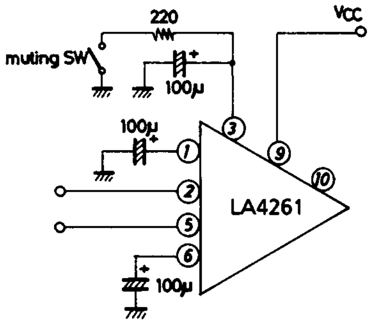
Note for Changing Voltage Gain

Basically, the voltage gain can be reduced by adding external resistors (R_{NF}) in series with feedback capacitors C1, C4. However, it should be noted that since there is no phase compensation pin the frequency response is extended and oscillation is liable to occur when the voltage gain is reduced. The voltage gain must not be reduced to be less than 30 dB.



External Muting

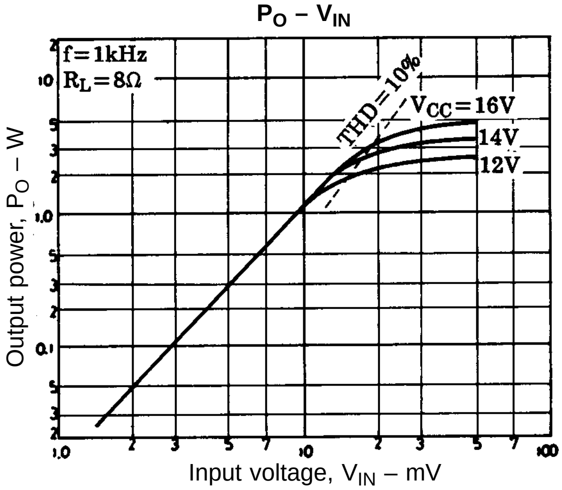
If external muting is required, make the circuit as shown right. In this case, the attack time, recovery time, and pop noise are similar to those which occur at the time of power switch ON/OFF.

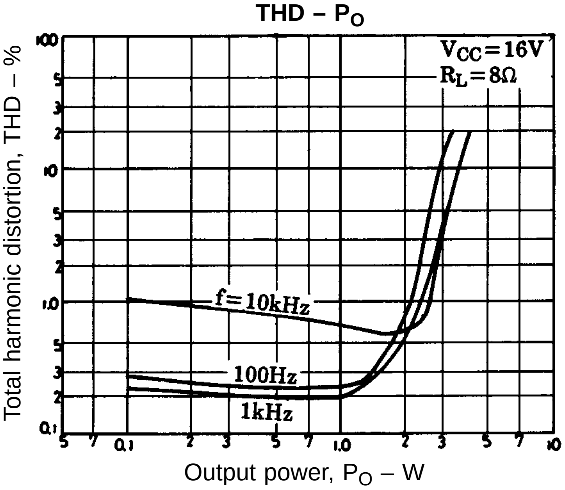


Unit (resistance: Ω, capacitance: F)

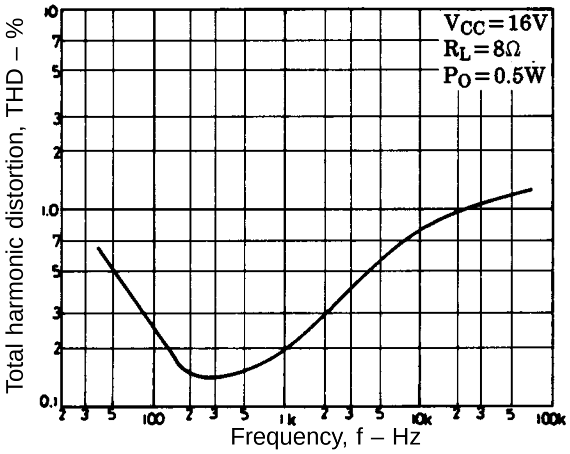
Proper Cares in Using IC

- Maximum ratings
  If the IC is used in the vicinity of the maximum ratings, even a slight variation in conditions may cause the maximum ratings to be exceeded, thereby leading to breakdown. Allow an ample margin of variation for supply voltage, etc. and use the IC in the range where the maximum ratings are not exceeded.
- Pin-to-pin short
  If power is applied when the space between pins is shorted, breakdown or deterioration may occur. When mounting the IC on the board or applying power, make sure that the space between pins is not shorted with solder, etc.
- When using in radios, allow a sufficient space between IC and bar antenna.
- Printed circuit pattern
  When designing the printed circuit pattern, make the power supply, output, and ground lines thick and short and arrange the pattern and parts so that no feedback loop is formed between input and output. Place power capacitor C9, oscillation blocking capacitors C6, C8 as close to IC pins as possible to prevent oscillation from occurring. Refer to the sample printed circuit pattern.

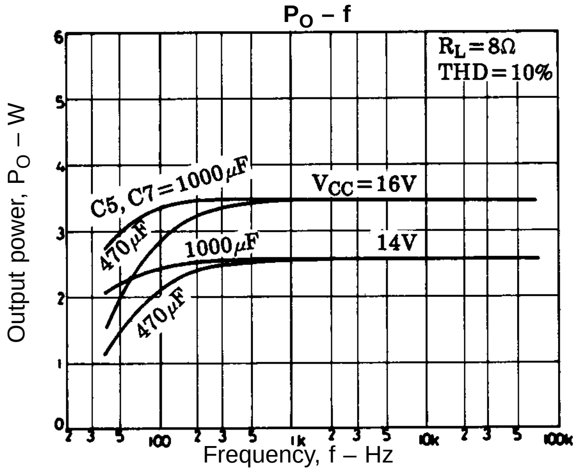




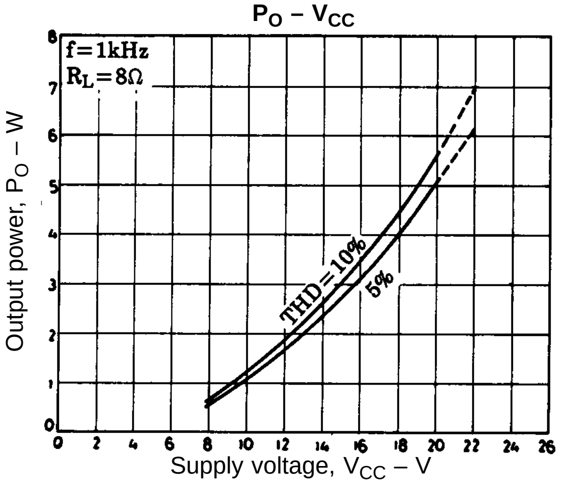
THD – f



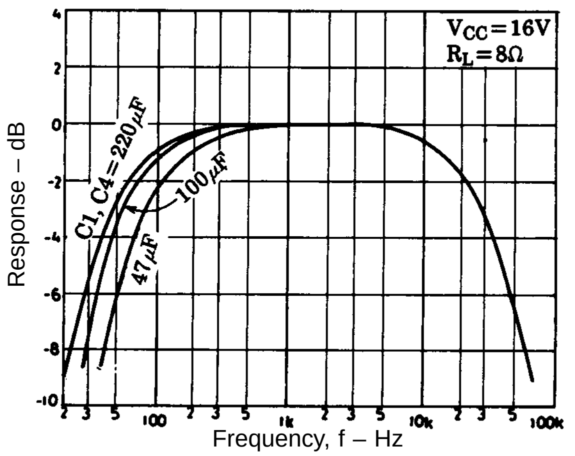
PO – f



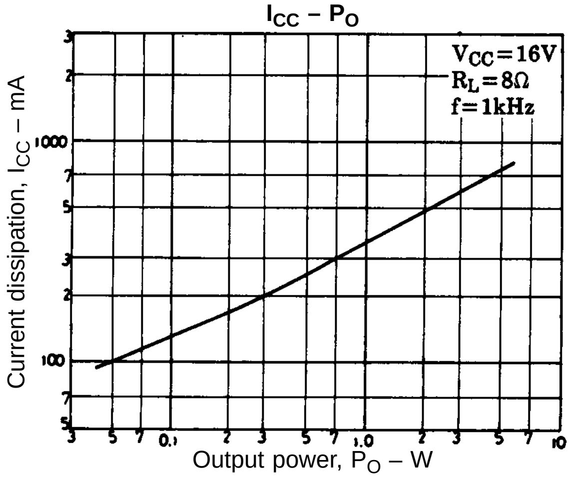
PO – VCC



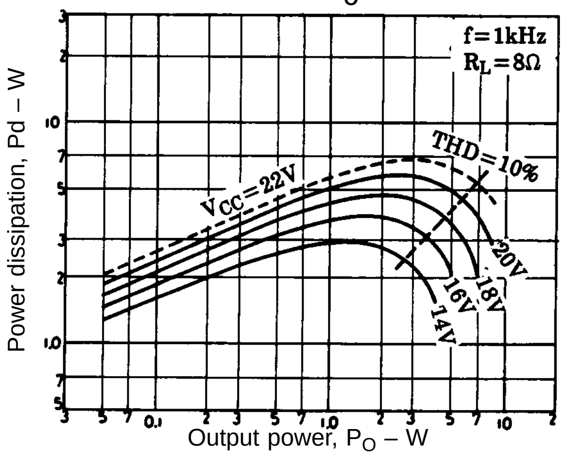
f Response



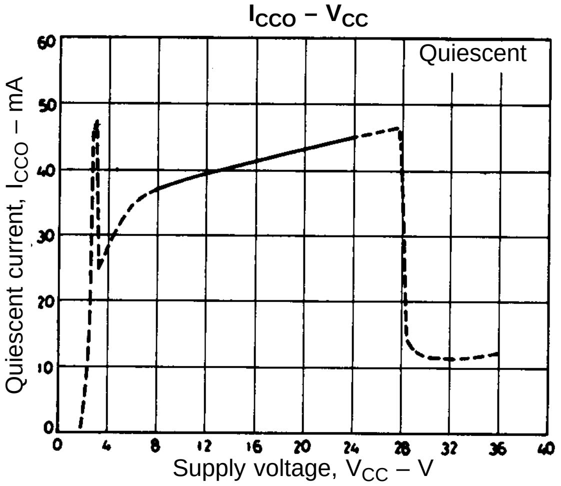
ICC – PO



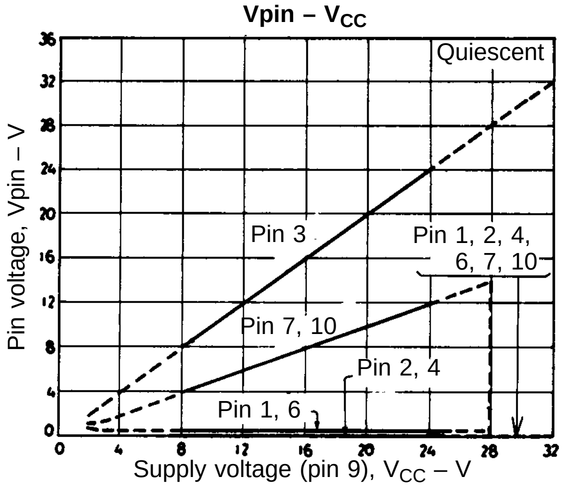
Pd – PO



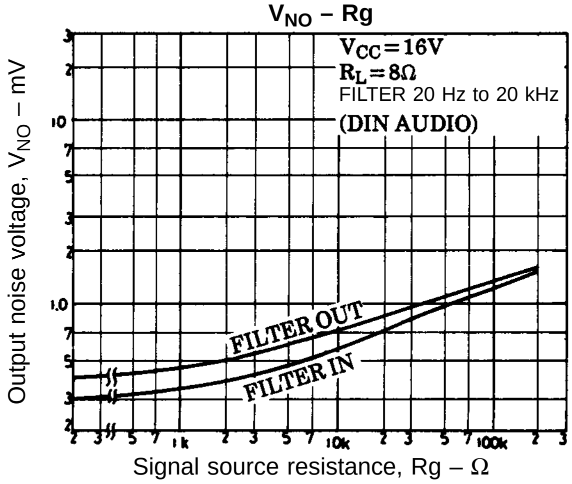
ICCO – VCC



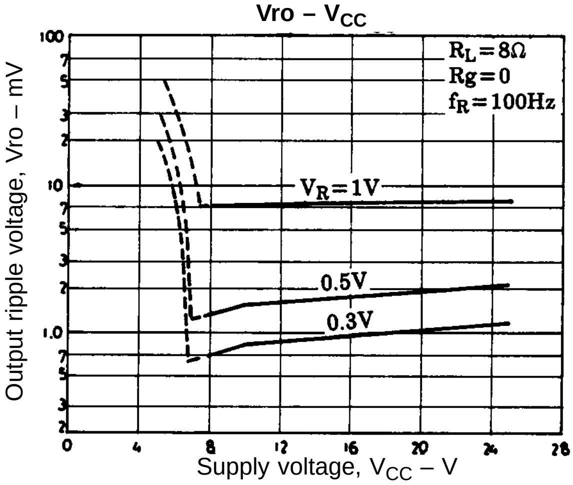
Vpin – VCC



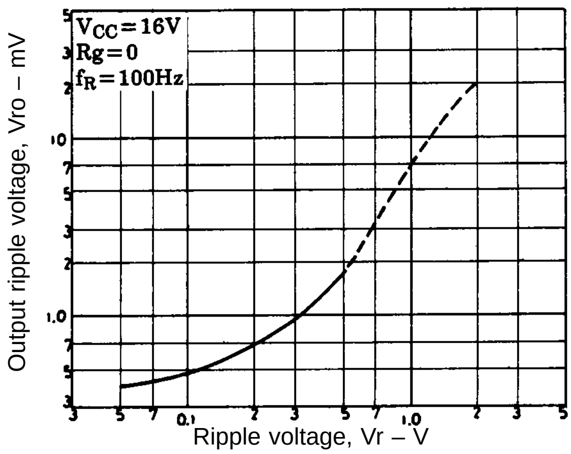
V_{NO} – Rg



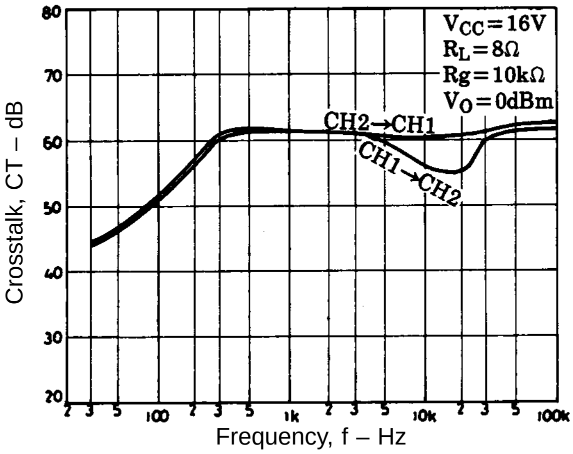
Vro – V_{CC}



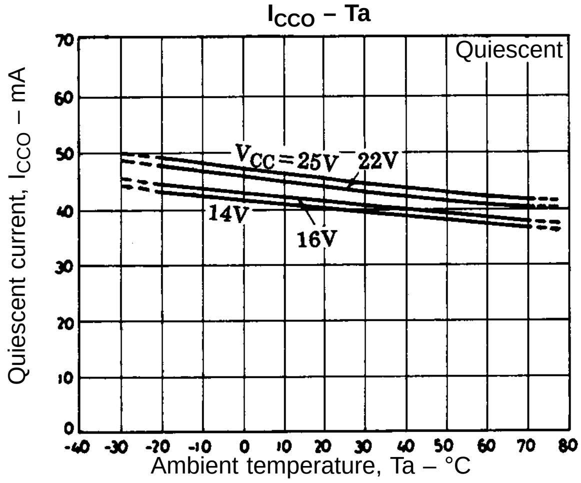
Vro – Vr



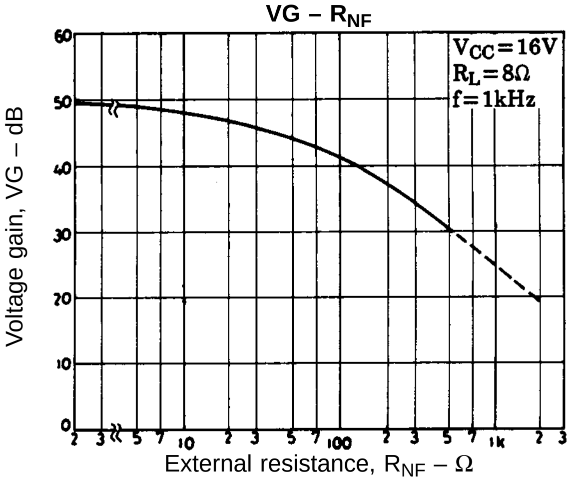
CT – f



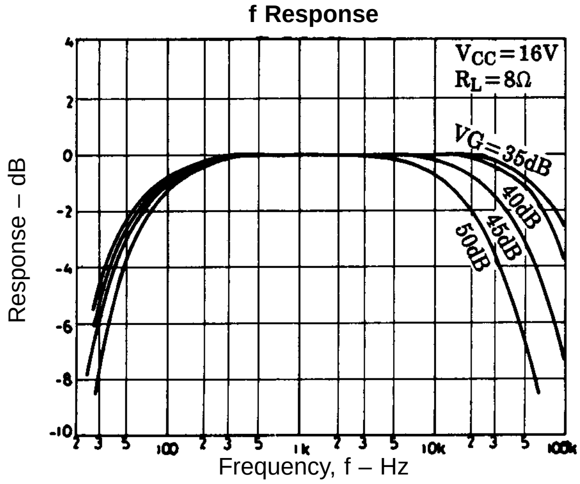
I_{CCO} – Ta



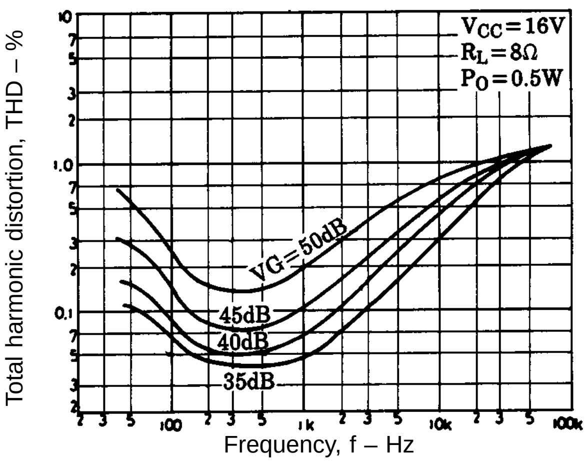
VG – R_{NF}



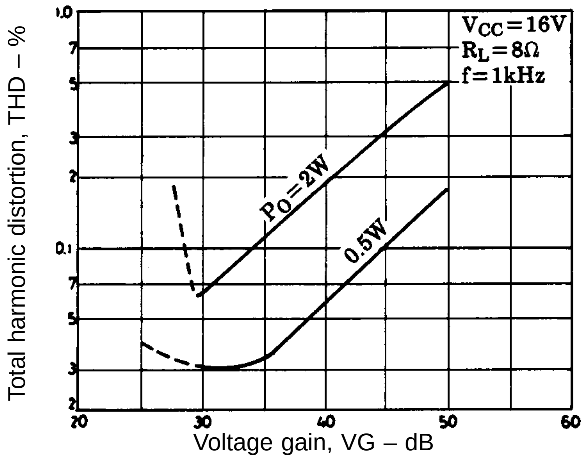
f Response



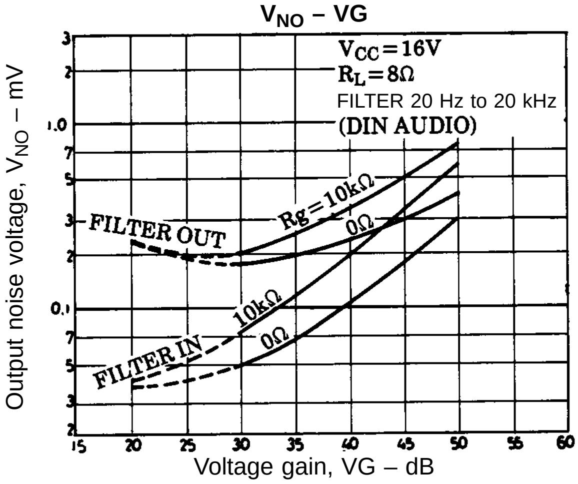
THD – f



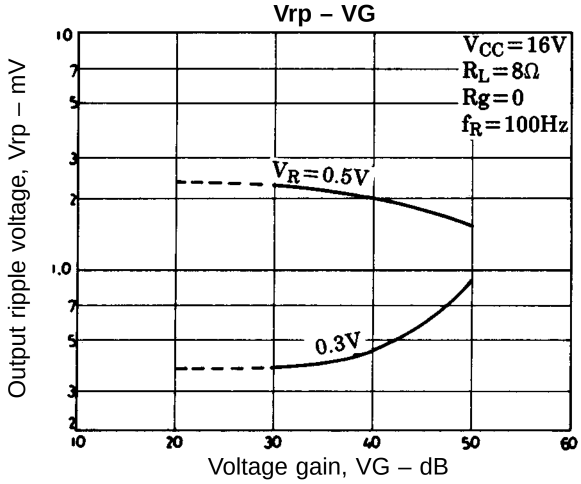
THD – VG



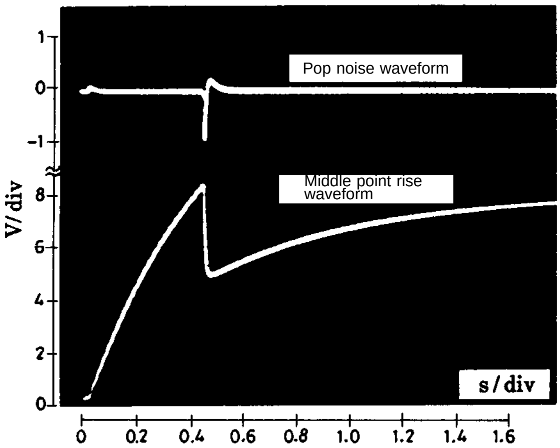
V_{NO} – VG



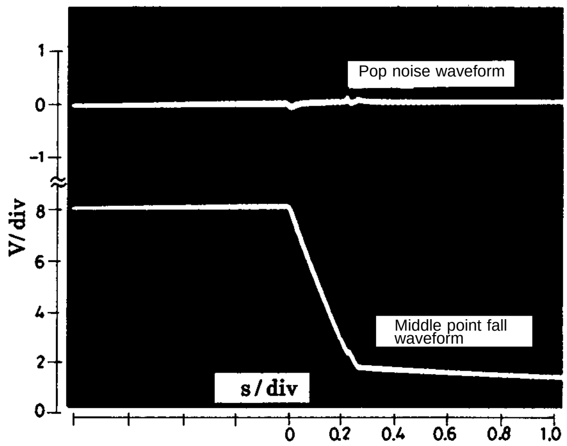
Vrp – VG



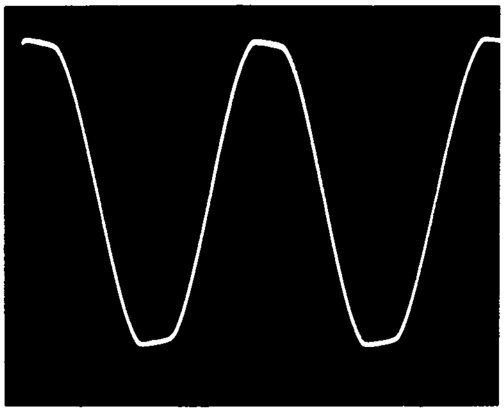
Pop Noise Waveform at The Time of Power Switch ON
(V_{CC} = 16 V, R_L = 8 Ω, quiescent)



Pop Noise Waveform at The Time of Power Switch OFF
(V_{CC} = 16 V, R_L = 8 Ω, quiescent)



f = 1 kHz Clip waveform
(V_{CC} = 16 V, R_L = 8 Ω, THD = 5%)



f = 10 kHz Clip waveform
(V_{CC} = 16 V, R_L = 8 Ω, THD = 5%)

